



Biofilms of nosocomial microorganisms

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The majority of nosocomial infections associated with the use of indwelling devices are caused by microorganisms of the genera *Staphylococcus* and *Candida*, being *S. epidermidis* and *Candida albicans* the predominant species. These species are able to adhere to abiotic and biotic surfaces and form biofilms (cellular communities embedded in a polymeric matrix) that are inherently tolerant to antimicrobial agents and host defences. Our work is focused on the mechanisms of biofilm formation on biomaterials and human tissue and on the virulence factors triggered by the microbial sessile mode of life. Particularly, we are interested on the physico-chemical mechanisms that rule microbial adhesion and the identification of the proteins involved in the adhesion process. We also study biofilm structure through CSLM and SEM observations and the composition of the biofilm-matrices [1]. As far as virulence is concerned we evaluate the antimicrobial tolerance of biofilm cells of different clinical isolates and the extent of expression of virulent molecules such as proteinases, lipases and intercellular-adhesion-polysaccharides. We are also studying the interaction of the biofilm cells with the immune system through *in vitro* and *in vivo* assays [2]. Finally, new antimicrobial agents such as bacteriophages and quorum sensing molecules are being tested against bacteria and yeast biofilms, respectively.

References

- [1] Silva S, Henriques M, Martins A, Oliveira R, Williams D, Azeredo J. Biofilms of Non-*Candida albicans* *Candida* species: quantification, structure and matrix composition. *Medical Mycology* (2007) 20, 1-9.
- [2] Cerca N, Jefferson KK, Oliveira R, Pier GB, Azeredo J. Comparative antibody-mediated phagocytosis of *Staphylococcus epidermidis* cells grown in a biofilm or in the planktonic state. *Infection and Immunity* (2006) 74:8, 4849–4855.